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Development of Attitude through Critical Thinking

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Abstract

No doubt, across the world, advantages of critical thinking in education motivated educators focus on developing the critical thinking ability and traits among students more than ever before, yet ample evidence from literature has shown the lack of critical thinking skills among students at all level. The purpose of the study was to examine the effectiveness of two teaching strategies questioning and role playing the development of critical thinking attitude among elementary students. This article offers critical thinking as a prelude to developing attitude among students by using case study method and design based approach. Two groups each with 15 students were made using purposive and convenience sampling method. Evidence was collected in a usual classroom context in the form of pre and post questionnaire data. The focus was evaluated through the indirect evidence of its effects on students' critical thinking attitude by using Paul's intellectual traits model. Findings suggest that critical thinking is a viable tool in influencing critical thinking attitudes of students in Pakistani context.

Keywords: Critical thinking, questioning, role play, Paul's standards, design experiment approach.

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Introduction

Researchers around the world, generally agree upon the pivotal role of critical thinking in individuals general as well as in academic life (Gillespie, 2011). In the field of education, it is generally accepted that critical thinking is essential for an individual's success in meeting with new challenges in ever-changing world where rational and evaluative thinking is considered crucial for sound judgment. Although, the relevance of embedding critical thinking in curriculum is inevitable, however, countries such as Pakistan where English is taught as second language, students face many challenges in developing critical thinking. They lack in analyzing complex matter in to its simple elements, adoption of critical thinking attitude by questioning and assessment and presentation of logical and reasoned arguments (Shamim, 2008). There is a debate regarding development of critical thinking through different teaching strategies. Paul and Elder (2007) state that questioning, role play, argumentation, reflection are effective techniques in fostering critical thinking skills.

Critical thinking is considered an essential tool for intellectual development of the students. The role of teacher is very crucial in implementing it. In Pakistani institutions the focus of education is rote learning which means transfer all factual information to students without digging the meaning beneath the surface. As Mohammad and Kumari (2007) argued that in Pakistani schools teachers are most concerned in transfer of factual knowledge rather than work as facilitators of students' knowledge development. Choy and Cheah (2009) state that those schools are not conducive for the development of creativity among students whose teachers lack the ability to foster critical thinking among students. However, for effective teaching and learning process teachers not only have a command over the subject but they should understand the conceptual, strategic, epistemological and educational ramification of critical thinning. Moreover in order to instill critical thinking skills among students, teachers must understand the objectives and conditions for the promotion of critical thinking (Dam &Volman, 2004).

Pakistani teachers mostly use traditional grammar translation method for teaching English. Teachers mainly focus on structured grammatical patterns which strictly focus on bookish knowledge. Such approach emphasizes students to produce correct sentences in terms of skill and is more focused on reading and writing. The grammar translation method is used by many language teachers in which teachers more focus on rote

memorization of syllabus instead of promotion of critical thinking skills (Nunan, 1999).

Alternative to this approach literature suggests many teaching approaches such as role play, problem solving and pair work etc., have the potential to involve the students in learning process longer that indirectly promote critical thinking dispositions like open-mindedness, fair-mindedness, perseverance and empathy among students (Colucciello, 1999; Walker, 2003). Alternative strategies more focus on process instead of content. They require students' motivation and active participation. However, researcher has experienced as a student and teacher that generally in all classroom instructions and particularly in the common Pakistani classrooms questioning is not encouraged. Most of the teaching and learning moves around the centrality of the text books and class teacher discourage students to be engaged in learning tasks from multiple perspectives. Hasil (2012) argued that most of the classroom activities do not prepare students to meet new challenges and these tasks are more focused on set answers rather than questions. In literature, Socrates opined that true thinking is driven by rational questions. If the answers of questions do not generate more questions, the questions are useless. Socrates stated that dead questions always create dead minds and they never develop productive and intellectual brains. Socrates used dialectical method in the class room, he used to ask questions and draw an answer from the students through dialogues. The researcher assumes questioning strategy may be effective if it is used in Pakistani classroom. Similarly, multiple researchers (Jenkins &Turick-Gibson, 1999; Liu & Ding, 2009) describe role play as significant teaching strategy that enables students to apply knowledge in real life context. Accordingly, Hassan and Madhum (2007) state that students while role playing interact with different persons, share information collaboratively that remove their ambiguities and inaccuracy of concepts. Role play also improves communication skills of students through exchanging dialogues with each other (Jeffries 2005; Mooradian, 2008). Additionally, Henneman and Cunningham (2005) advocate that role play plays a significant role modifying the behavior of students and provides them an opportunity to correct their mistakes by observing others.

Critical Thinking Attitude

There are many definitions of attitude as Forsyth (1987) describes that an attitude consists of three components; a feeling, a cognition and a

form of behavior. Each component affects each other and the entire behavioral structure.

Berg, Manstead, Pligt, and Wigboldus(2006) present ABC model of attitude and postulate that an attitude consists of three components, A' stands for affective part that deals with our emotional behavior, 'B' shows the instinct behavior propensity and 'C' shows the belief system of a person that is made up with experiences of a person. In the present study, researcher agrees with the description of ABC model in which attitude is divided into three different parts. The first is addressing the existing attitude of a person, second cognitive part that focus on judgment or evaluation of reasoning by a person about his learnt experiences and the third part addressed the effective part that stressed upon the quality of a person to decide good or bad, positive or negative about daily life events, situations and experiences. However, each partis different from the other, and they can build upon one another to form ones attitude and, therefore, affect how we relate to the world. For example, we may believe teenagers are lazy (cognitive), we do not have to hate the teenagers for being lazy (affective), but we could still try to keep them out of the library because of that fact (cognitive) or, we could indeed believe they are all lazy (cognitive), hate them for it (affective) and that would drive our behavior towards them (cognitive).

According to Halpern (2003), Nelson, (2005) and Paul (1995) a critical thinking attitude is the foundation of critical thinking that would be a reflection of a person's engagement in a meaningful task. Paul (1994) argues that a person reflects his critical thinking skills through dispositions such as intellectual humility, intellectual perseverance, empathy and autonomy. These traits such as (1) intellectual humility; means the ability to critically evaluate one's own knowledge and beliefs, (2) intellectual autonomy; means having rational beliefs about one's own understanding, (3) intellectual courage; is the ability to reject the irrational beliefs when strong evidence is provided and (4) intellectual empathy; is the ability to feel others emotions and intellectual perseverance to accept challenges through intellectual complexities.

According to Paul and Elder (2002) there are two types of thinkers' one group having strong sense critical thinking skills and the other who have weak sense critical thinking skills. People who have the skills to see everyday matters fair-mindedly instead of respecting their own interests are called strong sense critical thinkers .Conversely, weak sense critical thinking paves the way for egocentric and sociocentric thinking patterns that serve for the interest of a particular authority group of the society. Paul (1994)critical thinking trait model is used in the study, as he stresses

upon strong critical thinking for the development of intellectual traits of mind. He explains that if intellectual traits are developed among students then their attitude change and they start to think and behave like critical thinker as fair-mindedly, accurately and reasonably.

The purpose of current study is to inculcate the intellectual traits in students through questioning, role playing, and blended strategies for development of critical thinking and if the traits happen to bring change in the students' attitudes through intellectual traits then we can say that these strategies are productive in promoting critical thinking. An analysis is made of the attitudes of students at the start and at the end of the intervention based on the outcomes of pre and post questionnaires from all participants. One of the assumptions of the study is that critical thinking (CT) can be a productive strategy in teaching English in Pakistani schools, that if it brings change in attitudes by developing intellectual traits like intellectual humility, intellectual autonomy, intellectual integrity, intellectual courage, intellectual empathy and intellectual perseverance among elementary students through different tasks. Further, an analysis was made of the attitudes of students at the start and at the end of the teaching programme based on the outcomes of pre and post questionnaires from all participants to measure critical thinking affectively. If students' attitudes change over the intervention, this is taken evidence that CT has brought about the change, and is therefore viable and can be productive. This change was measured through observation and pre and post questionnaires.

Methodology

Research Design

This study employed case study approach along with Design Based Research (DBR) for intervention. Researcher thinks DBR can lead to better understand the complex and real situation than experimental approaches. DBR not only helps to understand, document and interpret the educational phenomenon but also changes and improves educational practice and opportunities (Cobb, Confrey, Disessa, Lehrer, & Schauble, 2003).In this study, usual classroom as a case was studied and investigated in relation to critical thinking.

Design based research is conducted in real world natural context to capture the phenomena as natural as it is to provide real picture of the context. In contrast with conventional experimental design, DBR seems

more appropriate in understanding social, complex and real situations in naturalistic settings(Collins, Joseph, & Bielaczyc, 2004; Wang & Hannafin, 2005). Design based research process is different from conventional experiment design in which controlling of variables and context is key feature. The Design-based research, by virtue of being conducted in real world context in collaboration with practitioners, is much more likely to lead to effective application.

This is because DBR like other quantitative research designs does not merely explore relationship between different variables without deep understanding instead it focuses on understanding the relationship of students and schools with the production of learning (Sandoval & Bell, 2004).

DBR is used in broader areas of educational research as its aim is to develop a new or modify existing curriculum, design artifacts and technological tools , design a new theory or modifies existing theories in naturalistic settings in order to provide new meanings of learning (Barab, Dodge, Thomas, Jackson, &Tuzun, 2007; Barab& Squire, 2004; Fishman et al., 2004). DBR has potential to extends the scope of existing methods of research as a powerful means in linking theory and practice in educational research (Faste & Faste, 2012). One of the great contributions of DBR is that it always strives for understanding, interpreting and improving educational practice (DBR, 2003). It can generate and test theories of learning in an authentic and naturalist real context. It involves teachers, researchers and other stakeholders in real life context for designing new interventions that will facilitate teaching and learning.

Productivity of DBR

The productivity of this intervention is studied in the form of the change in student thinking cognitively and affectively through the observation of dynamic student and student teacher interaction in experimental classes and the shift in student attitude through pre and post questionnaire data comparison. One class room of 4th grade students was selected as case study. The data was generated through questionnaire and observation.

Research Questions

1. Does Critical thinking change the attitudes of students?
2. Which teaching strategy (Questioning verses Role play) is more effective in promoting critical thinking among students

Participants

Through purposive and convenience sampling, two classrooms of 4th grade elementary students within the age range of 10-11 years from one urban Girls Public school of Lahore were selected. Two usual sections of 4th grade female students were used as two classrooms for the study. There were 15 students in each section. According to the spirit of qualitative research, no manipulation was made in selection of the participants and classrooms and they were selected randomly. Personal characteristics such as their socio-economic status and religion etc. were not considered as the focus of qualitative research was not getting control of the context.

Intervention

The intervention in this study comprises of teaching of grade four students by two teaching strategies; questioning and role play from August to December in order to develop critical thinking skills and attitude among students. Researcher taught in one classroom through questioning and in second through role play. The intervention period spreads over whole academic term that consists of 64 classes. There were four classes in one week according to the school timetable but school management allowed me to take two classes for intervention in a week. Every second class in one week was video recorded so the researcher reported recorded and analyzed episodes only. The researcher used episode instead of class.

Description of Tasks

All tasks are selected from 4th grade English text book followed by school. Paul's intellectual standards (clarity, accuracy, relevance, logic and fairness) were used as teaching and analytical tool. All tasks used in questioning and role play were based on these intellectual standards. In questioning technique questions were based on clarification of idea, accurate and relevant examples, logical inferences and fair mindedness among students. For example, teacher asked students in one episode the meaning and nature of discipline. After the clarification of the concept she posed another implication based question "what happens if there are two Gods in the universe. Such type of challenging questions let students assume the situation and then describe their inferences about discipline

or indiscipline. Similarly, in role play class room students were asked to play a role on "shopping". One person works as a customer and the other acts as shopkeeper. The purpose of the activity was to provide clarity of the purpose, significance and ways of shopping. Through role play students learnt from their mistakes and develop social skills.

Instrument

The questionnaire was adapted from Paul trait model (1994) to measure the change in critical thinking of the students. The questionnaire comprises of 23 items with total score of 92in accordance with 4 point likert scale ranging from 1 to 4 where 1 meant "*strongly disagree*" and 4 meant "*strongly agree*". Students were required to select one option out of four against each item.

The questionnaire items were developed by using of the following indicators of each trait. Intellectual traits were used as analytical tool in measuring the change in attitude of students.

Table 1

Critical Thinking Intellectual Traits and their Indicators

Standards	Indicator
Intellectual integrity	Hold same standards of thinking and behavior to which I hold for others
Intellectual humility	Awareness of one's limited knowledge
Intellectual courage	Courage to challenge wrong beliefs of others and ability to correct one's own wrong beliefs about facts.
Intellectual empathy	Ability to understand other's problems and miseries by putting oneself in the place of others
Intellectual perseverance	Ability to persistently use insight to face challenges and obstacles.
Intellectual autonomy	Ability to take decisions independently by oneself.

Source: Paul trait model (1994)

The questionnaire included items that assessed intellectual traits like intellectual humility, intellectual autonomy, intellectual integrity, intellectual courage, intellectual empathy, and intellectual perseverance. It was designed to classify students in one of three categories i.e., having weak (scores < 44), moderate (scores between 45 & 67), and strong critical thinking attitude (scores > 67). Among fifteen students assigned to questioning group, ten students obtained weak whereas five students

obtained moderate scores pre intervention in CT questionnaire. All fifteen students in role play group obtained weak scores in CT questionnaire before the start of intervention.

One class was taught through questioning strategy whereas another was taught through role play. The questionnaires were distributed to all students of two classes. The researcher was present at the time of filling the questionnaires to avoid students' confusion and misunderstanding about the items that may affect the reliability of scores. Therefore, there was 100 percent return rate.

A pilot study was conducted in order to know the application of methods, their practical implications, some possible problems and complexities because in my opinion for a sound base of a qualitative research, especially for a novice researcher needs to be supported by the trial of the research methods and tools in naturalistic settings.

For this study a pilot study was conducted in one primary public school. During piloting:

- The practical procedure of research was examined, specifically, the audio and video recording procedure that how it will be located to capture the activities of elementary students in a class room settings.
- The authenticity and reliability of research tools was investigated, specifically, Pre and post questioners in order to know the response of children, and to make any modification if it is required.
- Finally, the schedule of training interventions, time, space and order of the activities and the content for the actual research procedure was made.
- Further, feedback of 4 experts of University of Education about instrument was taken.

Content Validity

It is based on claims that items are not only relevant but representative of the targeted construct (Haynes, Richard, & Kubany, 1995). Items were finalized based on consensus description of dispositions of critical thinking by the 5 experts.

Formal written permission was sought from head mistress of one public school. She was briefed about the purpose and nature of study. She was explicitly informed about the audio and video recording of students and accordingly permission was also obtained from students' parents. School headmistress, respective students and their parents were assured that recordings will be kept confidential and will only be used for research purposes. The questionnaire was given to the students to answer

twice, before and after the intervention and difference between their responses was used to measure the attitude change of the students. The researcher was present at the time of filling the questionnaires to avoid students' confusion and misunderstanding about items that may affect the reliability of scores. The scale had adequate cronbach alpha reliability of .68 in this sample.

Results

This section is concerned with analysis of data collected from two classrooms to answer the research question. Statistical Package for Social Sciences (Version 21) was used to analyze the data .Results were analyzed through descriptive statistics such as means and non-parametric Wilcoxon Signed Rank Test was run to investigate the effect of different teaching methodologies i.e., questioning and role playing oncritical thinking attitude of students.

Quantitative Analysis of Questioning Technique

Data Collection

The research process was started by filling the pre questionnaire from all students of 4th class in order to know their level of critical thinking attitude before intervention. After the intervention, the post questionnaire was given to students to know the change in their critical thinking attitude.

Non-parametric Test Analysis

Although mean scores of CT of students shows the difference of scores in different intellectual standards. However, the researcher has used an inferential non parametric test i.e., Wilcoxon test to determine significant differences in students' critical thinking scores pre and post intervention.

Table 2

Mean, Standard Deviation and Wilcoxon Signed Rank Test of Critical Thinking Scores at Pre (n=15) and Post (n=15) Questioning Intervention, Within Groups

Variable	Assessment level	*M*	*SD*	*Z*
CT	Pre	23.53	2.669	
				-3.417*
	Post	39.80	3.858	

Note: *p <.05

The results of Wilcoxon Signed Rank Test showed that there is significant within group mean difference before and after the start of questioning as intervention strategy on the scores of CT as calculated by *p*-value that is smaller than .05. The difference in the mean shows that CT scores trend is higher at post (*M*=39.80) than pre (*M*= 23.53) assessment level. The difference in the mean scores showed that 4th grade students improved their CT scores after the implementation of questioning intervention. A Wilcoxon Signed Rank test was chosen because it assesses whether the mean (average) of pre and post scores of students are statistically different from each other.

Quantitative Analysis of Role Play Strategy

Data collection

The same CT questionnaire that used in questioning classroom was given to all students in another classroom where role play strategy was used to promote their CT. Students were given pre and post questionnaires in order to know their level of CT. They were briefed about the guidelines to fill the questionnaires. Pre questionnaire was given to them before intervention and post questionnaire was given after the intervention. Researcher was present throughout the time to guide students in filling the questionnaire. Students were given 50 minutes to complete pre and post questionnaires.

Analysis

This part presents mean differences of students taught through role play exercises in pre and post CT questionnaires. Difference in mean scores of students as depicted in figure II showed a change in their critical thinking skills as they improved in all intellectual standards and it can be considered an evidence of the effectiveness of the intervention.

Non Parametric Test Analysis

Researchers have used a non-parametric Wilcoxon test to show the difference of CT scores of students taught through another teaching strategy role play.

Table 3

Mean, Standard Deviation and Wilcoxon Signed Rank Test of Critical Thinking Scores at Pre (n=15) and Post (n=15) Role Play Intervention, Within Groups

Variable	Assessment level	*M*	*SD*	*Z*
CT	Pre	21.53	2.549	
				-3.413*
	Post	42.80	3.745	

Note: p <.05

A Wilcoxon Signed Rank test was chosen because it assesses whether the mean (average) of pre and post scores of students are statistically different from each other. The results of Wilcoxon Signed Rank test showed that there is significant mean difference between pre and post assessment on the scores of CT as calculated by p-value that is smaller than .05. The difference in the mean shows that CT scores trend is higher at post (*M*= 21.53) than pre (*M*= 42.80) assessment level .The difference in the mean scores showed that students improved their CT scores after the implementation of role play intervention.

Table 4

Mann-Whitney U Test indicating Between Group Differences in Critical Thinking Attitude Scores at Pre and Post Intervention Level (N = 30)

Variable	Intervention Level	*N*	*M*Rank	*U*	Z
SectionI[a]		15	12.67	70.00	-1.54
SectionII[b]	Pre	15	17.50		
Questioning		15	8.27		
Role Play	Post	15	22.73	4.00	-4.51***

Note:[a]= section I was taught through questioning strategy during intervention; [b]= section II was taught through role play strategy during intervention

p<.001

Results in table 1V revealed that fourth grade elementary students of two sections were not statistically different in their critical thinking scores before the start of intervention. During intervention, critical thinking mindedness was enhanced among students of section I through questioning whereas it was enhanced through role play among fourth grade students of section II. Results depicted that students who were taught through role play strategy showed significant improvement in their critical thinking scores as compared to the students who were taught through questioning strategy. These results also showed the effectiveness of role play technique in promoting CT among 4thgraders.

Discussion

The focus of the study was to analyze the change in critical thinking attitude occurred by the intervention. Findings show that Questioning and Role play both strategies influence critical thinking attitudes of students. Questioning is the heart of critical thinking as, "thinking is question driven" (Paul & Elder, 2002).One of the best ways to approach teaching the parts of thinking is to foster questions (Elder, 2002).Although both questioning and role play strategies were effective in promoting critical thinking attitude among elementary students; behavioral observation of researcher revealed that students showed more involvement and engagement in playing a role rather involve in questioning. Students seemed more confident and enthusiastic in playing role. Jeffries (2007) and Mooradian (2008) report that role play enhances student motivation and learning. Further, they improve their courage and autonomy by playing challenging new roles. As Joyce, Weils, and Calhoun(2009) explain that role play involves students in a real problem situation to solve a problem through action, as in role play activity a problem is presented, acted out and discussed. Moreover, he reports that, role play serves as vehicle for students to explore their feelings, gain insight of their attitudes, improve their self-confidence, improve their problem solving skills and remove their shyness by interacting with each other. Mooradian (2008) argues that in role play students convey a message through expressions and their expressions show their open-mindedness, empathy and autonomy.

In the study, Paul and Elder (2002) trait model was used to measure the critical thinking attitude of the students. It was supposed that if students follow intellectual standards they may develop some traits of mind such as intellectual humility, intellectual empathy, intellectual perseverance, fair-mindedness and open-mindedness. The findings

showed that the intervention proved effective in promoting intellectual traits that was considered an outcome of critical thinking. The findings support the hypothesis that critical thinking affects attitudes of students by showing significant change ($p<.05$) in pre and post critical thinking attitude questionnaire's scores of students. Students reported highly significant difference in all intellectual traits respectively. The findings are consistent with the findings of Paul and Elder (2007) who consider intellectual traits such as intellectual integrity, intellectual humility, intellectual empathy as interconnected web with critical thinking and must be studied in connection with each other.

Conclusion

The results showed questioning and role play as productive strategies in influencing critical thinking attitudes of elementary students. However compared to questioning strategy, role play was found more effective teaching strategy in promoting critical thinking attitude among students. It was a novel experience for them. One of the reasons for better outcomes of role play in promoting critical thinking may be attributed to the fact that experiential learning activities increase students' interest in the course work and they better understand subject matter.

Recommendation

In future, researchers can assess the effectiveness of blended learning strategy in the development of critical thinking attitude among elementary students as questioning and role play when used simultaneously; deepen the conceptual understanding of the students by working within, and reflecting upon, a representation of a real environment.

Appendix

Critical thinking attitude Questionnaire

	Integrity	Strongly agree	Agree	Disagree	Strongly disagree
1	I always stick with my beliefs either they are wrong				
2	I change my opinion frequently -				
3	I always respect others as much as myself				
4	I always accept my faults and try to improve my mistakes				
	Humility				
5	I never proud of my knowledge				
6	I never feel ashamed in taking help from others in problem solving				
7	I always consult other sources of knowledge to increase my information				
8	I always think that I have sufficient knowledge about any issue -				
9	I always rely on my knowledge -				
	Courage				
10	I never accept wrong opinions under pressure				
11	I always challenge wrong ideas of others and present my opinion what I think is right				
12	I accept the opinions of my friends in any case -				
13	I always willing to correct my wrong beliefs				
	Empathy				
14	I always try to protect my point of view when I disagree with others -				
15	I explain my point of view politely when I disagree with others				
16	I always show sympathy for my opponents when they disagree with me				

	Perseverance				
17	I always show patience in difficult situations				
18	I always accept challenge and finish my task				
19	I use different strategies to deal with problems				
20	I give up my assignment in pressure -				
	Autonomy				
21	I always take decisions independently				
22	I never follow others blindly				
	I take help of others while taking decision -				
23	I face problem alone and never care about criticism of others				

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